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AMSAT NEWS SERVICE
ANS-336

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to:
ans-editor at amsat.org.

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see:
http://www.amsat.org/mailman/listinfo/ans

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SB SAT @ AMSAT $ANS-336.01
ANS-336 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 336.01
 From AMSAT HQ KENSINGTON, MD.
DATE December 2, 2018
To All RADIO AMATEURS
BID: $ANS-336.01

Fox-1Cliff Launch Targeted for December 2nd

SpaceX has announced that the SSO-A: SmallSat Express mission carrying Fox-1Cliff is now targeted for launch on Sunday, December 2, 2018 at 18:33 UTC.

In addition to Fox-1Cliff, the SSO-A mission will carry several other amateur radio satellites, includingF UNcube on ESEO, JY1-SAT, K2SAT, and ExseedSat.

The launch window opens at 18:31:47 UTC and extends for approximately

30 minutes.

At press time less than 24 hours remain until the scheduled launch of Fox-1Cliff! The SpaceX video feed of the launch and a live blog of the launch events can be found on the AMSAT website: https://www.amsat.org/fox-1cliff-launch-live-blog/

Some amateur operators choose to participate in an unofficial on-line chat (Internet Relay Chat) at: https://webchat.freenode.net/ then enter your callsign as your Nickname; enter #cubesat as the Channel. You do not need to 'Auth to services' so leave that unchecked. Verify you are not a robot and then Connect.

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On-Orbit Checklist Activities

We will begin the rest of the in orbit checklist activities at that time, and it is expected to take 7 to 10 days.

Help your friends and all of our satellite ham friends get on the air and have fun sooner by being polite and patient!

The in orbit checkout procedure is similar to Fox-1D and could be completed in as little as 7 days if we have the cooperation of the users. It is very important, not to mention just plain good Amateur Operating Practice, to refrain from using the transponder uplink so we can do the on orbit tests, including when we turn on transponder mode for testing. I cannot stress enough, the importance of this cooperation not just for us but also for all users, simply having a little patience so we can conduct the tests as quickly and accurately as possible.

Activation for Amateur Radio Access

AMSAT will make it broadly known when the tests are complete and the transponder is available for all to use. If you hear someone on the transponder, please do not assume that it is open for general use - check our website, Facebook, Twitter, to be sure you are not accidentally jumping in with and unwittingly causing interference as well.

Many hams put thousands of volunteer hours of their time into making Fox-1Cliff happen. Just like any ham radio project you might undertake, we build satellites. We do it because we like to, and when we are done, we freely share our project with hams everywhere as is the spirit of amateur radio. I have to say though, that the incidents we have experienced in the past with stations intentionally disregarding the command stations requests to keep the frequency clear during testing not only delays the commissioning, but also negatively impacts the enthusiasm that our volunteers feel toward handing over a new bird to the members and users as soon as possible.

I am asking all satellite hams to contribute just a little bit of your time to the fun now, by being patient and just gathering telemetry, not using the transponder uplink, and helping us complete the last few days of getting Fox-1Cliff in orbit and operating for all of you.

Fox-1Cliff Technical Details

Uplink: 435.300 MHz / 1267.300 MHz** with 67 Hz CTCSS Tone
Downlink: 145.920 MHz
** Uplinks switched by command station, not operational simultaneously
Nominal operating frequencies may vary slightly after launch.

Ground stations need to adjust your transmit frequency for Doppler Shift. One suggested approach includes programming 5 uplink frequencies into memory channels and stepping through the channels depending on Fox-1Cliff's relative position to you. (Fc in the table below is the nominal uplink center frequency = 435.300 MHz).

Full duplex operation is recommended to allow you to hear if you are tuned on-frequency and also avoids interfering if another station is transmitting.

ADJUSTING YOUR UPLINK FREQUENCY to TRACK DOPPLER SHIFT

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-----------------------------------------------------
AOS         (Memory Channel 1) Fc - 10 KHz 435.290 MHz
Approaching (Memory Channel 2) Fc - 5 KHz  435.295 MHz
Nearest     (Memory Channel 3) Fc          435.300 MHz
Departing   (Memory Channel 4) Fc + 5 KHz  435.305 MHz
LOS         (Memory Channel 5) Fc + 10 KHz 435.310 MHz

Access the Fox-1 Operating Guide on-line at:
https://www.amsat.org/station-and-operating-hints/
Find all of AMSAT Fox-1 frequencies on-line at:
https://www.amsat.org/fm-satellite-frequency-summary/
SatPC32 users can find updated *.SQF files at:
http://tinyurl.com/ANS-336-SatPC32files

[ANS thanks Jerry Buxton, N0JY, AMSAT Vice President-Engineering for
the above information]

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AMSAT Web Adds Donation Portal

AMSAT relies on your donations to Keep Amateur Radio in Space.
Please consider a donation to the AMSAT General Fund, the GOLF
Program, or ARISS today!

Access the Donation Portal on the AMSAT front page
http://www.amsat.org --> Select Donate from the main menu bar
-or- visit https://www.amsat.org/donations/ for direct access to
the page.

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+ The first received and uploaded frame - First come, first served!
+ The last received and uploaded frame - During the deorbit sail
   deployment sequence!
+ The largest number of uploaded frames

PW-Sat2 will transmit on 435.275 MHz using 1k2-9k6 BPSK AX25.

[ANS thanks the PW-Sat2 team for the above information]

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slot at ~24°E. After testing the satellite will be moved to the location planned to be at 26°E.

Peter Guelzow, DB2OS, explained the current testing and commissioning procedures, "During the next 1-2 month Es'hail-2 will undergo fine tuning and extensive In-Orbit-Testing (IOT). The current orbital position is selected to not interfere with other GEO satellites nearby. Once testing is finished, the satellite will slowly be drifting to and stationed at the final position."

The checkout and inauguration of the both AMSAT transponders will be performed after the IOT phase is finished as explained at:
https://amsat-dl.org/p4a-positionining-and-iot

Peter reported several "hunters" have already spotted the Engineering beacon from Es'hail-2, so obviously everything looks good and is going according to plan.

Stay tuned for latest news on https://amsat-dl.org and the official Es'hail-2 / P4-A discussion forum on:
https://forum.amsat-dl.org/index.php?board/3-es-hail-2-amsat-phase-4-a/

The AMSAT Phase 4-A transponder on Es'hail-2 is a joint project by the Qatar Satellite Company (Es'hailSat), the Qatar Amateur Radio Society (QARS) and AMSAT Deutschland (AMSAT-DL).

Recent Keplerian Elements for Es'hail-2 are:
```
ES'HAIL 2
   1 43700U 18090A   18331.74832885  .00000138  00000-0  00000+0 0  9994
   2 43700   0.0937 247.5840 0001194 359.8609 112.5666 1.00272646   252
```

Pedro, LU7ABF says that the tracking site on the AMSAT-Argentina web provides visualization of the current satellite location and footprint:
http://amsat.org.ar/pass?satx=ESHAIL

[ANS thanks Peter Guelzow, DB2OS, AMSAT-DL for the above information]

Nihon University NEXUS VU-mode Linear Transponder Launch Announcement

Mikio Mouri, JA3GEP, JAMSAT, announced the Japan Aerospace Exploration Agency (JAXA) plans to launch RAPIS-1(RAPid Innovative Payload Demonstration Satellite) and three small satellites (Micro-Dragon, RISESAT, ALE-1) and three CubeSats (OrigamiSat-1, Aoba VELOX-IV, NEXUS) on January 16, 2019 at 00:50 UTC (January 17, 2019 at 09:50 JST) from the JAXA Uchinoura Space Center.

NEXUS(NExt generation X Unique Satellite) is designed and manufactured by Nihon University, and it includes a VU-mode(mode-J) Linear Transponder:
+ Uplink: 145.930 MHz - 145.900 MHz
+ Downlink: 435.880 MHz - 435.910 MHz
+ Telemetry: 437.075 MHz 0.1W CW

Nihon University has published more information about NEXUS:
http://sat.aero.cst.nihon-u.ac.jp/nexus/1_Nexus.html
(using google translate may help)

OrigamiSat-1 will have downlinks on 5840.000 MHz (115kbps data rate) and 437.505 MHz (1k2 AFSK and CW)

Aoba VELOX-IV will have a downlink on 437.225 MHz (9k6 GMSK AX25)

Access the JAXA launch announcement press release at:
http://global.jaxa.jp/press/2018/11/20181130_epsilon4.html

[ANS thanks Mikio Mouri, JA3GEP, JAMSAT for the above information]

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KE4AL	480	502
NM3B	416	481
AA8CH	351	406
AE5B	295	300
N3GS	277	300
KE8FZT	254	275
W7JSD	239	257
N4YHC	175	250
PT2AP	200	221
PS8ET	201	211
K3RRR	New	200
AD0HJ	100	175
WW8W	128	152
K9UO	New	150
WA7HQD	138	148
PU8RFL	125	134
PS8MT	New	130
K7ULS	New	119
CU2ZG	New	101
PU8RJI	New	101

If you find errors or omissions. please contact me
off-list at <mycall>@<mycall>.com
and I'll revise the announcement.

This list was developed by comparing the ARRL .pdf
listings for November 1, 2018 and December 1, 2018.
It's a visual comparison so omissions are possible.
Apologies if your call was not mentioned.

Thanks to all those who are roving to grids that are
rarely on the birds. They are doing most of the work!

[ANS thanks Ronald Parsons, W5RKN for the above information]

Upcoming Satellite Operations Reported by KE4AL

+ Yuri UT1FG/MM will be going into port at Santos Brazil during
   the week of November 26-30 to unload. It should take 3-4 days.
   His next port will be in Argentina where he will load cargo and
   then proceed to the Baltic Sea. Lots of new grids are anticipated
   along the way. He has been active on all of the SSB and FM birds
   and reports contacts with V51 and ZS on AO-7.
   (via K8YSE on amsat-bb)

+ James WX4TV wrote, "Watch the DX Clusters for N4P." This will be
   for the Dry Tortugas National Park DXpedition that we are doing
   from December 14-17. They will be on 80m, 40m, 20m, 17m, and the FM
   satellites. (WX4TV via Facebook)

+ Switzerland (FN30, JN36, JN47) – November 28 – December 7, 2018
   Brennan, N4QX, fall ASMAT roving plans:
   * JN36 as HB9/N4QX & from 4U1ITU November 28 – December 7
     as work permits
   * JN47 as HB9/N4QX & HB0/N4QX December 1-2
   For now, FM only. Watch Twitter for pass announcements.
   https://twitter.com/BrennanTPrice. QSLs *exclusively* via
   Logbook of the World.

+ Brazil (GH62,GH63,GH72,GH73) – November 30, 2018
   PP2CC, PT2AZ amd PT2AP will activate 4 grids in Brazil on
   30 November. Specific passes should be announced on Twitter
   https://twitter.com/PT2AP

+ Oahu and Maui (BL01, BL10, BL11) – December 3-14, 2018
   John, N7AME, will be in Hawaii December 3-14. John hopes to
   rove BL01, BL10 and BL11, but the Hawaiian Islands appear
   to have ten (10) different grids, and he hopes he can work
   all of them. John can only work FM satellites AO-91 and AO-92.

+ Greenburg, PA (FN00) – December 10-12, 2018
   Tanner, W9TWJ, will be travelling for business the week of
   December 10-12, to Greensburg, PA (FN00). He will attempt to
   be active on FM evening passes and hopefully not freeze!
   Specific pass announcements will be posted to Twitter:
   https://twitter.com/twjones85

+ RMS Queen Mary (DM03) – December 15, 2018
   Patrick , WD9EWK, will be part of a day of satellite operating
   from a deck on the RMS Queen Mary, docked at Long Beach in southern
   California, on Saturday 15 December 2018. Operations will be port-
   able, almost like a Field Day, and should include FM, SSB, and
   possibly packet. All operations from the Queen Mary will be as
   W6RO, the call sign for the wireless room on the ship operated by
   the Associated Radio Amateurs of Long Beach. Depending on staffing
   in the W6RO wireless room, there may also be HF activity during
   the satellite operation. QSLing for the W6RO satellite activation
   will be handled per the procedure on W6RO's QRZ page:
   http://www.qrz.com/db/W6RO

Please submit any additions or corrections to ke4al (at) amsat.org

[ANS thanks Robert, KE4AL for the above information]

ESA and RaspberryPi.org Collaborate on Astro Pi Mission Zero

The European Space Agency announced the official launch the of
Astro Pi Mission Zero, part of the 2018-2019 European Astro Pi
Challenge. This is an ESA Education programme run in collabora-
tion with RaspberryPi.org. In this challenge, students and young
people get the chance to have their computer programs run in
space on the International Space Station!

Read the full entry details and get the latest program resources
on-line at:
https://www.raspberrypi.org/blog/mission-zero-2018-19/

Students and young people will have until 20 March 2019 to form
teams and write a simple program to display their personal mes-
sage to the astronauts onboard. The Mission Zero activity can
be completed in a couple of hours with just a computer and an
internet connection. You don't need any special equipment or
prior coding skills, and all participants that follow the
guidelines are guaranteed to have their programs run in space.

[ANS thanks ESA and RaspberryPi.org for the above information]

MarCo Cubesats Relay NASA's InSight Mars Lander Touchdown

Riding along with NASA's InSight Mars Lander were two CubeSats,
the first of this kind of spacecraft to fly to deep space. The
twin communications-relay CubeSats, built by NASA's Jet Propulsion
Laboratory, Pasadena, California, constitute a technology demon-

stration called Mars Cube One (MarCO).

Visit the MarCo web pages and watch a mission video at:
https://www.jpl.nasa.gov/cubesat/missions/marco.php -and-
https://www.jpl.nasa.gov/news/news.php?feature=7295

During InSight's entry, descent and landing (EDL) operations, the lander transmitted information in the UHF radio band to NASA's Mars Reconnaissance Orbiter (MRO) flying overhead. MRO would then forward EDL information to Earth using a radio frequency in the X band, but cannot simultaneously receive information over one band while transmitting on another. Confirmation of a successful landing could be received by the orbiter more than an hour before it's relayed to Earth.

The two CubeSats separated from the Atlas V booster after InSight's launch, then travelled along their own trajectories to Mars. After release from the launch vehicle, MarCO's deployed two radio antennas and two solar panels. The high-gain, X-band antenna is a flat panel engineered to direct radio waves the way a parabolic dish antenna does. MarCO navigated to Mars independently of the InSight spacecraft, with its own course adjustments on the way.

The successful MarCO cubesat demonstration mission it could allow for additional communications relay option for use by future Mars missions in the critical few minutes between Martian atmospheric entry and touchdown.

[ANS thanks NASA for the above information]

Happy 20th Anniversary to the International Space Station

The largest and most complex international construction project in space began on the steppes of Kazakhstan 20 years ago this month. Atop its Proton rocket, on Nov. 20, 1998, the Zarya Functional Cargo Block (FGB) thundered off its launch pad at the Baikonur Cosmodrome into cold wintry skies. Zarya was built by the Khrunichev in Moscow and served as a temporary control module for the nascent ISS.

On Dec. 4, Space Shuttle Endeavour on the STS-88 mission roared off Launch Complex 39A at Kennedy Space Center in Florida, carrying the Unity Node 1 module in its cargo bay. Built by The Boeing Corporation at a facility at the NASA Marshall Space Flight Center in Huntsville, Alabama, Unity was the first American component of the ISS.

A collection of interesting ISS historical articles begins at:
https://www.nasa.gov/feature/20-years-ago-iss-construction-begins

[ANS thanks NASA for the above information.]

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Brookville, NY. Frank Garofalo, WA2NDV will host the "Satellite Operations for Beginners" forum scheduled for 9:00 AM. Find the full details at: http://hamradiouniversity.org/

+ The European Space Agency published a timelapse video of the Russian Progress MS-10 cargo spacecraft launched on 16 November 2018 at 18:14 GMT from Baikonur cosmodrome, Kazakhstan, taken by ESA astronaut Alexander Gerst from the International Space Station:
https://www.youtube.com/watch?v=ouBfzCgXHgk&feature=youtu.be
The Progress spacecraft delivered food, fuel and supplies, including about 750 kg of propellant, 75 kg of oxygen and air and 440 liters of water. Also on-board was the replacement #ARISS packet module. Some notable moments in this video are:
00:07 Soyuz-FG rocket booster separation.
00:19 Core stage separation.
00:34:05 Core stage starts burning in the atmosphere as it returns to Earth after having spent all its fuel.
00:34:19 Progress spacecraft separates from rocket and enters orbit to catch up with the International Space Station.
(most of the action occurs on the top-right portion of the screen)

+ Listen for amateur radio clubs at NASA facilities as they participate in the NASA On The Air activity to commemorate the 50th anniversary of the Apollo 8 mission that spanned launch December 21, 1968, to splashdown on December 27, 1968. The 50th anniversary event will start on 0000 UTC December 21, 2018 through 2359 UTC December 27, 2018. 14.271 MHz and other bands depending on conditions with spotting announcements on DX clusters, facebook, and twitter. QSL and a certificate with information available on QRZ.com under the callsign of the stations contacted. This will mark the concluding event of the year-long NASA On the Air celebration of 60th anniversary of NASA. See https://nasaontheair.wordpress.com/

+ Congratulations to Jharwin, DW2JHA on apparently the first IGATED ISS packet from the Philippines. He built his own TNC to digipeat packets using his FT-60 radio. His IGATE is based on a Raspberry Pi Zero, DireWolf packet software, and an RTL-SDR dongle. (via DW2JHA on AMSAT-NA facebook)

+ F1NNI maintains the AAR29 Satellite Status Page at:
http://aar29.free.fr/sat/indexlogin.html

+ AMSAT-UK explains their software series of FUNcube Payload Telemetry Dashboards - Each satellite with a FUNcube payload has a dedicated dashboard and we have created a one page PDF summary of those dashboards, their current version number and a dedicated download link, see:
https://amsat-uk.org/2018/12/01/funcube-payload-telemetry-dashboards/

+ A number of free technical items have crossed the editorial desk this past week:
- Rhode & Schwartz has a free Wireless Communications Standards Poster for download: http://tinyurl.com/ANS-336-RhodeSchwartz
- AMSAT-DL found a source for rocket paper models: http://tinyurl.com/ANS-336-RocketModels
- A book Wi-Fi paradigm shift with 802.11ax is available at: https://content.aerohive.com/802.11ax_dummies_book
- A book Visualize the Relationships in Your Connected Data. Download the O'Reilly Graph Databases Ebook for Free: https://neo4j.com/lp/book-graph-databases-fb

+ Registration for the 2019 CubeSat Developers Workshop Sponsor & Exhibitor is now open. This year the cubesat workshop will be

held April 23-25, 2019 at the Cal Poly Performing Arts Center, San Luis Obispo, CA. Register at: https://calpoly.irisregistration.com/Register?code=cubesat-sponsors-2019 Their e-mail is cubesat-workshop(a)calpoly.edu. Join the mailing list at: http://www.cubesat.org/mailinglist/ or follow on Twitter @CalPolyCubeSat for the latest Workshop updates! #CubeSatDW

+ India launched a PSLV flight on Thursday, November 29 that included four CubeSats which are using 70cm downlink frequencies that have been coordinated by the IARU:

- FacSat-1 - 9k6 GMSK downlink
- 3CAT1 - 9k6 FSK downlink
- InnoSat-2 - 50kHz wide telemetry using AX25 proprietary packet format
- Hello World - 9k6 packet 2GFSK for telemetry & 1Mbps MSK downlink on S Band

For more details of these cubesats see the IARU pages at: see http://www.amsatuk.me.uk/iaru/finished.php See also the AMSAT-UK summary at: https://amsat-uk.org/2018/11/27/ham-radio-satellites-launch-from-india/ (Graham Shirville, G3VZV)

[ANS thanks everyone for the above information]

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information.

73 and remember to behave, and do your part to help Keep Amateur Radio In Space,

This week's ANS Editor,

JoAnne Maenpaa, K9JKM
k9jkm(a)amsat.org